

Stressed Out? It Might Be Messing with Your Memory

Right when you thought stress and anxiety were bad enough on their own, new research shows they can seriously mess with your memory

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Everyone has had an experience like this one: You're running late for an important meeting, frantically tearing apart the house on a desperate search for the car keys you just put down...*somewhere*. Or at the other extreme, you spent weeks freaking out over an upcoming presentation only to deliver all the key points with Oscar-accepting eloquence when the day arrives.

So what is it that makes a person either go completely blank or perform brilliantly on simple tasks involving memory when feeling stressed?

The answer is complicated, and the [best doctors](#) out there are finally teasing out some of the bigger mysteries behind how that three-pound mass of electrochemical soup remembers, or forgets, where the damn keys are. An old adage says a little stress is good for memory, and a lot is bad—but it turns out to be true only for men. New research suggests that gender matters when it comes to memory and stress, whether that stress is acute, chronic, or traumatic.

Acute Stress

"Your son's test came back, and it's irregular," the doctor told Denise Carleton, then a stay-at-home mom in Mill Valley, California. After hearing those alarming words, the 36-year-old nearly fainted as her body crashed over with waves of stress and fear. For the past month, she'd worried that her 2-year-old was regressing on all of his developmental milestones, such as talking and walking. But she never suspected that he could have a serious medical problem.

Initially, she could barely hear the rapid-fire questions the physician blasted at her. But then she snapped to, answering in detail about when he first walked, talked, and smiled; the dates of his last vaccinations; and every symptom over the past month. "In the midst of this incredible stress, I suddenly remembered *everything*," she says today. "Stuff that on a normal day I would be hard-pressed to recall."

Being able to remember things and learn new info depends entirely on the ability of networks of neurons—mostly in the areas of the brain called the prefrontal cortex and the hippocampus—to communicate with one another. Picture each neuron as an old-fashioned telephone, but with multiple wires snaking out from the receiver. Some of those wires are called axons, and they intersect with other wires called dendrites at connections called synapses. The brain creates and retains memories in part by growing thicker, more efficient communication lines between groups of neurons—basically, by hooking up the phone wires and keeping them on a biological speed dial. When you try to remember when your son first smiled, says Todd Sacktor, M.D., a professor of neurology at the State University of New York Downstate College of Medicine, the phone lines should start buzzing with activity, connecting the neurons that hold those memories. *Ah, he was 4 months old and reaching for his favorite teddy bear.*

But then you hear that your child might be really sick. Immediately, the fight-or-flight sympathetic nervous system unleashes stress hormones, such as epinephrine and cortisol, into the "phone" system, generally making the connections crisper and clearer. The result: "As a safe general rule, a moderate to strong amount of acute stress—stress that happens once and then goes away—tends to be good for memory," says Larry Cahill, Ph.D., a professor of neurobiology and behavior at the University of California at Irvine. Over the years, research has backed something called an inverted U response, meaning that as stress levels increase, so does memory performance—up to a person's own optimal level of stress. Add more than that and memory function fizzles.

Then, on a hunch, Cahill's lab decided to take a closer look at how sex differences might play a role in this long-established "safe general rule" and, surprisingly, discovered in one experiment that the rule *did not* apply to women. In that experiment, Cahill tested the memories of both men and women after an acute stress and found that the stressful event enhanced the memories of the men but did not do so for the women. (Yes, Denise Carleton's killer recall seems to contradict this, but stay with us.) It was a puzzling finding: The levels of stress hormones were elevated equally in both males and females—so why didn't it have the same affect on their memories?

Thinking that perhaps stress hormones were interacting with sex hormones, they ran the experiment again, this time using only women and controlling for various phases of the menstrual cycle. They discovered that when women had high levels of estrogen (before and during their periods), stress fuzzed up their recollection, but when they had high levels of progesterone, following their cycle, stress boosted recall—just like it did for guys. In other words, women received the memory lift that acute stress provides only when their estrogen levels were normal.

Cahill's work was groundbreaking—and goes a long way toward explaining Denise's peak performance in the doctor's office (she was in that high-progesterone part of her cycle). It also explains why, on other days when she's been pelted with curveballs, she's been known to forget that she tossed her cell phone on the bumper of her truck or left a takeout pizza on the roof.

"Most of the research on stress and memory has been done in adult male humans, rats, and monkeys," says Victoria Luine, Ph.D., a neuroendocrinologist at Hunter College in New York City, whose own work has since revealed similar findings. "Scientists have taken the male model and just assumed that females are the same. It's a big assumption, and it's wrong."

Especially, it turns out, when it comes to the impact of chronic stress.

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<http://www.womenshealthmag.com/health/stress-memory>